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ABSTRACT

A study was conducted to determine if it was possible to identify and distinguish between poor readers who had a knowledge deficit and those who were somehow different (dialect speakers trying to read material in Standard English, for instance). A group of 20 fourth and fifth grade students were tested with normal prose, words in isolation, and phrased prose. It was hypothesized that deficit poor readers would show improvement between the word list mode and the normal prose mode while difference poor readers would show gains in the phrased prose mode. However, no differences were found among the subjects to support the hypothesis that there are distinct categories of reading disability that parallel the difference and deficit models. (TJ)

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Using Facilitation and Interference Ratios to Identify the Underlying Processing Strategies of Poor Readers

Paper presented at the Annual Meeting of the National Reading Conference (28th, St. Petersburg Beach, Florida, November 30-December 2, 1978)

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Running Head: Poor Readers

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Using Facilitation and Interference Ratios to Identify the Underlying Processing Strategies of Poor Readers

Wiener and Cromer (1967) have posited a comprehensive model of "reading difficulty" which identifies four distinct perspectives - if not etiologies - for delayed development. Poor readers, they assert, may be poor because they exhibit one or a combination of the following four interfering factors.

1. a defect - some form of organic impediment or malfunction which prevents them from developing normally. The impairment is considered to be relatively permanent (e.g., brain damage).
2. a disruption - something which is present in the learner but interfering with the normal acquisition process that must be removed before normal learning can take place (e.g., an inability to attend to instruction due to hyperactivity).
3. a deficit - something which is missing in the learner which must be added before normal progress can be made (e.g., a skill deficiency).
4. a difference - a mismatch between the typical mode of responding in the learner and that implicit in the learning environment (e.g., a dialect speaker and text materials written in standard English).

Most programs for remedial instruction in reading are based largely on the assumption of a deficit need within the student. The teacher's role is to first identify the missing skills, then to systematically deliver instruction in those areas where the need is greatest. While the perspective

of a deficit need may be valid for some students, the Wiener and Cromer model would suggest that there are other students for whom this assumption is perhaps inappropriate and even misguided. An assumption of difference, for example, would indicate that remedial strategies might be best pursued by making adjustments in the curriculum to fit the child rather than attempting to adjust the child to meet the curriculum. Conceding that the assumption of defect and disruption are legitimate etiologies for certain cases of reading disability, it is possible to focus on the deficit and difference models.

The question arises as to whether these are not simply two different instructional perspectives of the same problem or two entirely distinct problems. In other words, are these simply labels for how we attempt to treat his problem (adjust the child vs. adjust the curriculum)? Or, are there at least two identifiable kinds of poor readers - difference and deficit - each suited to distinct remedial methodologies?

To explore this question, Cromer (1970) conducted a research study with college level students in which he attempted to identify difference and deficit poor readers and then compare their reading performance with that of good readers. The two groups of poor readers were identified based on the relationship between their vocabulary and comprehension scores on a standardized reading test. Deficit poor readers had low vocabulary scores compared to comprehension levels (a phenomenon common to the group of good readers as well); while the difference poor readers had high vocabulary scores relative to their level of comprehension. Cromer's explanation is that deficit poor readers perform much like good readers when they read, only they lack the basic information background

(e.g., vocabulary) to be successful. Difference poor readers have the necessary background but are somehow unable to integrate or synthesize this knowledge successfully during connected reading in the same manner as do good readers.

Cromer hypothesized that the group of difference poor readers could be assisted in the integration process by restructuring the text materials into thought units. Indeed, he found that after regrouping the text into meaningful phrases, performance on comprehension measures by the difference poor group was greatly enhanced. As hypothesized, this reorganization of material did not have a similar facilitating effect on deficit poor readers (nor good readers for that matter) who presumably had no difficulty in the area. The implications of his study are clear. First, that difference poor and deficit poor reading problems are distinct categories and not just two perspectives of the same disability. And second, that there are adjustments to the curriculum (in this case, the organization of prose) which can be manipulated to facilitate performance on reading tasks by difference poor reader.

The goal of the research to be reported here was to extend this line of investigation to younger children. The immediate objectives were to determine if these two kinds of poor readers could be successfully identified and if they exhibit the same performance characteristics as their older counterparts. Since the parameters employed by Cromer for identification could not be applied with sufficient reliability (i.e., vocabulary and comprehension scores performance on standardized reading tests) at this early level of achievement, it was necessary to devise a new technique of assessment. The method that was chosen is based on a comparison word

recognition accuracy under three different conditions: (1) words in isolation; (2) words in normal context; and (3) words in restructured (phrased or chunked) text materials. It was hypothesized that deficit poor readers should perform much like good readers in terms of increased accuracy when moving from the isolated to the normal context conditions (as demonstrated by Goodman in 1965). The Cromer model for deficit poor readers would also lead us to predict no gains in accuracy for the deficit poor group between the normal and chunked conditions since their fundamental problem is not one of integrating the language into units. On the other hand, it was hypothesized that difference poor readers would show no such gains between isolated and normal conditions with respect to word accuracy. In fact, it was predicted that this context might even interfere with recognition and cause these readers to perform more poorly in context than in isolation. It was finally hypothesized that difference poor readers would show gains in accuracy of word recognition moving from the isolated words to the text organized into meaningful language units.

Subjects

All fourth and fifth grade students attending the summer reading tutorial program conducted on the campus of the University of Texas were screened for participation in this study. Those students capable of reading orally the 3A (3.3 grade level difficulty) and the 3C (3.8 grade level difficulty) passages from the Spache Diagnostic Reading Scales with an accuracy level of from 87-97% were selected. This screening procedure resulted in the identification of 20 subjects for the study.

Procedures

Three sets of reading materials were prepared for use in collecting the data:

1. Normal Prose. The same two passages used in the screening of subjects (3A and 3C of the Diagnostic Reading Scales) doubled as the normal prose reading condition materials.
2. Words in Isolation. A word list was constructed from the vocabulary used in the 3A and 3C passages. The words in the list were arranged in random order. All words in both passages were included in the list. Words appearing more than once in the passages were included only one time on the word list.
3. Phrased Prose. Passage 3C of the Diagnostic Reading Scales (3.8 grade level difficulty) was reorganized and retyped such that each line of the text reflected constituent and phrase structures. For example, the sentence: "The men of the first band were dressed in scarlet, with white feathers in their hats." became:

"The men
of the first band
were dressed
in scarlet,
with white feathers
in their hats."

The sequence for testing under each of these conditions was the same for all subjects. They were first asked to read the word list, then the two normal prose passages, and finally the single passage under the phrased condition. No assistance was given with unknown words. The subjects were forwarned that they should try their best with words they were

unsure of and then continue with their reading. Both accuracy of pronunciation and reading rate were monitored.

Data Analysis

A correlation matrix was constructed relating a number of direct and derived indices of student performance both within and between conditions (Figure 1). The variables included in this analysis were:

1. Number of Miscues - computed for connected reading under both normal (NMN) and phrased (NMP) conditions. Substitutions and omissions were the only miscue types included in this category of subject performance.
2. Word List Accuracy - the total number of words missed under the word list reading condition (WLA).
3. Percent Accuracy - a percent accuracy for performance was computed for both normal (PAN) and phrased (PAP) reading based on the total number of words under each condition. A percent accuracy change score (PAC) was also computed for each subject to reflect the gain or loss in accuracy upon moving from the normal to the phrased condition (PAN - PAP - PAC).
4. Facilitation Ratio - the total number of words missed on the word list but identified correctly in context (normal prose) divided by the total number of word list errors (FR).
5. Interference Ratio - the total number of words missed in context (normal prose) but identified correctly on the word list divided by the total number of errors made in context (IR).

Discussion

The rationale for the design used in this study was based on the assumption that within the group of subjects identified through the screening proceudre, there were both difference and deficit poor reading types. Given the tentative and exploratory nature of the techniques being used to attempt to identify these two groups, the application of correlation techniques seemed a logical starting place. In this way it would be possible to examine both the strength and direction of performance characteristics relative to the original hypotheses of this study to determine if, in fact, the predicted relationships were confirmed by the data.

The primary hypothesis of this study was that there should exist a strongly negative (or inverse) relationship between the Facilitation Ratio (FR) and the Interference Ratio (IR). That is, those subjects who make the best use of context to identify unknown words should be those for whom context causes the least difficulty in recognizing words they know in isolation. Conversely, subjects who benefit least from context should be those for whom context might interfere with the identification process. Contrary to this expected relationship, the Facilitation Ratio exhibited a fairly high positive correlation (.63) to the Interference Ratio (see Table 1). Apparently, those subjects who faired best in correcting their word list errors in context were the ones who tended most to miss words in context that had been previously identified correctly on the word list. Comparing this finding with Goodamn's (1965) observations, one might infer that both good and poor readers use context cues but for poor readers there is a concurrent, confounding effect for context operating as well.

	FR	IR	PAC	PAN	PAP	WLA
FR	1.000					
IR	.63 s=.001	1.000				
PAC	0.02 s=.474	.23 s=.162	1.000			
PAN	.60 s=.003	.61 s=.002	.14 s=.275	1.000		
PAP	.22 s=.172	.42 s=.032	.94 s=.001	.48 s=.017	1.000	
WLA	-.29 s=.110	.47 s=.019	-.45 s=.023	-.77 s=.001	-.67 s=.001	1.000

TABLE 1. CORRELATIONS OF PERFORMANCE VARIABLE UNDER VARYING CONDITIONS (N=20).

A secondary hypothesis of this study was that there should exist a strongly negative relationship between the Facilitation Ratio (FR) and the gain in accuracy moving from normal to phrased context (PAC). That is, those subjects who were able to use context most from the isolated to the normal context conditions (i.e., the deficit poor readers) should benefit least in terms of gains in accuracy of pronunciation moving from normal to phrased conditions. On the other hand, those students who benefited least in the movement from isolation to context (i.e., difference poor readers) should show the greatest gains in accuracy moving from the normal prose to material which has been phrased for them. In fact, the data revealed no such trend in terms of the correlation between FR and PAC (.02). The facilitation ratio did show, however, a fairly strong correlation (.60) to performance on accuracy in the normal context condition.

A final hypothesis of this study was that there should exist a strongly positive relationship between the Interference Ratio (IR) and the gain in accuracy moving from the normal to phrased context. That is, those subjects who demonstrated the greatest gains moving from the normal to the phrased context reading (the difference poor readers) should be those who missed the most words in context that had been identified correctly on the word list. While those subjects who showed the smallest gains from normal to phrased context (the deficit poor readers) should have missed few if any words in context that they had identified correctly in the word list. Again, the data failed to support this hypothesis in terms of the correlation between IR and PAC (.23).

Conclusions

The findings of this study offer no support for the position that

there are distinct categories of reading disability which parallel the Wiener/Cromer difference and deficit models. This is not to say that these specific kinds of etiologies do not exist. Perhaps with another identification procedure or a different age group, more supportive evidence might be gathered. And this is certainly not to deny the value of the perspectives for reading disabilities offered by their model. In the final analysis, it may well be that the contribution of the Wiener/Cromer model rests in its insight as to how our perceptions of reading problems might be useful in orienting our efforts to devise solutions.

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